



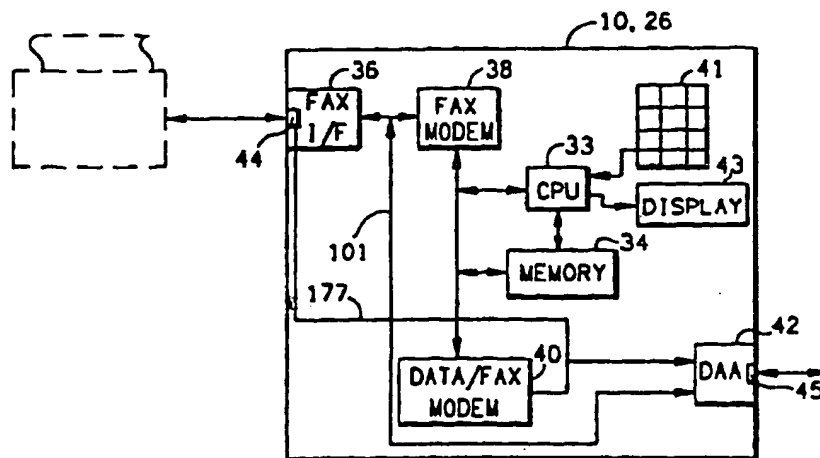
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04N 1/00	A1	(11) International Publication Number: WO 97/10668 (43) International Publication Date: 20 March 1997 (20.03.97)
<p>(21) International Application Number: PCT/US96/13790</p> <p>(22) International Filing Date: 29 August 1996 (29.08.96)</p> <p>(30) Priority Data: 08/528,552 15 September 1995 (15.09.95) US</p> <p>(71)(72) Applicant and Inventor: KULAKOWSKI, Robert, T. [US/US]; 1483 Neptune Avenue, Leucadia, CA 92024 (US).</p> <p>(74) Agents: MAXWELL, Lawrence, D. et al.; Brown, Martin, Haller & McClain, 1660 Union Street, San Diego, CA 92101-2926 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>	

(54) Title: INTERNET FACSIMILE SYSTEM

(57) Abstract

A device and method for transmitting or receiving faxes via a packet-switched computer network to which the device connects itself via the public switched telephone network (PSTN). The device may be an interface connectable between a conventional fax machine and a telephone line, or it may be an integrated fax machine including a scanner, printer, keypad and other features of a conventional fax machine. The interface-type device generates signals that emulate the signals a conventional fax machine would receive via the telephone line. The user feeds a document into the fax machine in the conventional manner, and the device receives the fax data from the fax machine. The device establishes a telephone connection via the PSTN with a computer on the network, such as that of an on-line service provider. The device converts the fax data into a suitable email format, with a header that indicates the email address of the intended recipient and an image attachment representing the fax image data. The device then transmits the email message to the service provider. The service provider's computer may route the email message to the recipient via any packet-switched network to which its computer is connected. Via the Internet, the email message can be sent to any recipient having access to the Internet. At the recipient's site, a similar interface device receives the email message, removes the fax image attachment from the email message header, and provides the image data to a conventional facsimile machine.



INTERNET FACSIMILE SYSTEM

BACKGROUND OF THE INVENTION

5 A conventional facsimile ("fax") machine optically scans a paper document and transmits the image in a digitally encoded format via a telephone connection to a remote fax machine. The remote fax machine decodes the image data and prints the resulting document on paper. A fax machine includes a fax modem. A modem is a device that converts data
10 between the voltage modulated format used by digital computer circuitry and the frequency or phase modulated format required for transmission via a telephone connection. A fax modem is different from a data modem, such as the type conventionally used to allow two computers to communicate via a telephone connection. Although both fax modems and data modems
15 perform the modulation and demodulation function, fax modems and data modems encode the data in accordance with different standards and use different communication protocols. The most common fax modem standard is known as the Group III ("G3") standards of the International Telecommunication Union (ITU). The highest speed fax modems support
20 communication at a rate of 14,400 bits per second (bps) using ITU standard V.17. The most common data modem standards, which are also promulgated by the ITU, are V.34 (28,800 bits per second (bps)), V.32bis (14,400 bps), V.32 (9600 bps), V.22bis (2400 bps), V.22 (1200 bps), V.23 (600/1200 bps), and V.21 (300 bps). A fax modem operates in half-duplex
25 mode, while a data modem operates in full-duplex mode. Modems known as "data/fax" modems can communicate in accordance with both ITU fax modem and ITU data modem standards. Data/fax modems are commonly used in computers, but neither data modems nor data/fax modems are used in fax machines. Consequently, a fax machine cannot communicate with a
30 computer via a telephone connection.

 Although two computers having modems can send messages, including ASCII-encoded text and bit-mapped images, to one another via a direct telephone connection, an increasingly common method for sending messages is known as electronic mail ("email"). A person can use a remote
35 computer and modem to send messages to a central computer via a telephone connection. The central computer stores the message as well as

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reassembled. A packet-switched computer network may be contrasted with a point-to-point network, such as the public switched telephone network (PSTN). When two parties communicate via the PSTN, a direct, dedicated connection exists between them.

5 To retrieve email from a service provider, the subscriber uses a computer and a modem, under the control of software that is typically provided by the service provider, to call the service provider's computer. When the service provider's computer answers, it typically queries the subscriber for a username and password. If the subscriber enters the
10 correct username and password, the service provider's computer "logs in" the subscriber and allows the subscriber to perform various functions, including determining whether email messages intended for the subscriber have been received and stored and, if so, downloading the email messages to the subscriber's computer. When the subscriber is finished, the
15 subscriber logs out and terminates the telephone call.

 The subscriber can view the downloaded email messages and image attachments and listen to audio attachments. Typically, a computer reproduces an image attachment under the control of software via a video card and a video monitor, and reproduces an audio attachment under the
20 control of software via a sound card and a speaker. Nevertheless, certain data and data/fax modems have integral digital-to-analog converter circuitry and compression circuitry to facilitate voice message communication. The computer can selectably place the modem in either a data mode or an audio mode.

25 Software is known that causes a computer and modem to periodically, e.g., once every hour, call a service provider, log in, determine whether any email messages have been received and stored, and download any such email messages, and log out. Mail Handling System (MHS), produced by Novell Corporation, is an example of such software that can be
30 run on a Novell network server.

 Certain service providers provide a email-to-fax forwarding service. The service provider receives an email message from a subscriber, converts the body of the message into an image in accordance with fax standards, and re-transmits the fax image via a telephone connection to a recipient's
35 fax machine. The sender provides the telephone number of the recipient's fax machine as part of the email message header.

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Fax machines that connect directly to a local area network (LAN) without special interface equipment for converting fax formats to computer network formats have been proposed by Microsoft Corporation of Redmond, Washington under the name MICROSOFT AT WORK. Because such a fax machine would connect directly to the LAN, it would not include a data modem. It has been proposed to enable such a fax machine to selectably send a fax via either the LAN or the PSTN. In essence, the proposed MICROSOFT AT WORK fax machine is a fax file server for data networks.

It would be desirable to provide a system for economically transmitting faxes to remote recipients at maximum transmission speeds. These problems and deficiencies are clearly felt in the art and are solved by the present invention in the manner described below.

SUMMARY OF THE INVENTION

The present invention includes a fax device and a method for transmitting or receiving fax or voice mail messages via a packet-switched computer network to which the device connects itself via the public switched telephone network (PSTN). The device may be an interface connectable between a conventional fax machine and a telephone line, or it may be an integrated fax machine including an image scanner, printer, keypad and other features of a conventional fax machine. In the former embodiment, the device generates signals that emulate the signals a conventional fax machine would receive via the telephone line. The sender dials the recipient's telephone number on the fax machine keypad or handset. To send a fax, the sender feeds a document into the fax machine in the conventional manner, and the device receives the fax data from the fax machine. Alternatively, to send a voice mail message, the sender speaks into the handset, and the device receives and digitizes the audio signal from the fax machine. The device establishes a telephone connection via the PSTN with a computer on the network, such as that of an on-line service provider. The device converts the fax or voice data to be transmitted into a suitable email format, with a header that indicates the email address of the intended recipient and an attachment representing the fax image or voice data. The device then transmits the email message to the service provider. The service provider's computer may route the email message to the

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may presently use without incurring any charges other than those of the on-line service provider. The invention thus allows faxes to be sent worldwide significantly more economically than is possible using prior art fax systems. The invention also allows faxes to be sent at speeds significantly higher than are possible using prior art fax systems because data modems typically operate at higher speeds than fax modems. Importantly, the invention is completely transparent to a user; the user may send and receive faxes in the manner to which the user is accustomed, without learning any new procedures.

10 The foregoing, together with other features and advantages of the present invention, will become more apparent when referring to the following specification, claims, and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

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For a more complete understanding of the present invention, reference is now made to the following detailed description of the embodiments illustrated in the accompanying drawings, wherein:

20 Figure 1 is a schematic illustration of a system for transmitting faxes via network service providers;

Figure 2 is a block diagram of a device for interfacing a fax machine to a telephone line;

Figure 3 is a block diagram of an integrated fax machine device;

Figure 4 illustrates an email message having an attached fax image;

25 Figure 5 is a flow diagram illustrating a method for transmitting a fax message having an image attachment via a network;

Figure 6 illustrates software modules with which the interface device may be programmed;

30 Figure 7 is a flow diagram illustrating a method for retrieving messages having image attachments stored by a network service provider;

Figure 8 is a flow diagram illustrating a method for receiving messages provided by a network service provider;

Figure 9 is a flow diagram illustrating a method for transmitting a fax message having a voice attachment via a network; and

35 Figure 10 is a flow diagram illustrating a method for retrieving messages having voice attachments stored by a network service provider.

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display 43. Interface devices 10 and 26 may further comprise any additional support circuitry (not shown) commonly used in computer systems, such as circuitry for supporting a printer, serial port, local area network (LAN) connections, or voice inputs and outputs. Although this
5 dual-modem approach provides advantages described below, fax modem 38 is preferred but not necessary.

Fax interface circuitry 36 emulates the signals normally provided on the telephone line by a telephone company via the PSTN. These signals include a ring signal, dial tone, and a loop-current signal. Fax interface
10 circuitry 36 also includes a DTMF decoder (not shown) for detecting telephone numbers dialed on the fax machine to which it is connected. Fax interface circuitry 36 also includes a telephone standard Data Access Arrangement (DAA) that provides the electrical interface to a fax machine.

In the United States this interface will conform to the requirement of
15 Federal Communications Commission (FCC), Part 68. Accordingly, as those of skill in the art will appreciate, fax interface circuitry 36 preferably includes a hook-relay, off-hook detection circuitry, and a 600 ohm telephone transformer (not shown), as well as a RJ-11 jack 44 for connecting to a corresponding jack (not shown) on the fax machine using a suitable cable
20 or cord.

Telephone interface 42 includes a standard telephone Data Access Arrangement (DAA) that provides the electrical interface to the telephone line. Accordingly, as those of skill in the art will appreciate, telephone
25 interface 42 preferably includes a hook-relay and a 600 ohm telephone transformer (not shown), as well as a RJ-11 jack 45 for connecting to the telephone line floor or wall jack using a suitable cable or cord. For the reasons described in further detail below, the data-side connection of telephone interface 42 is selectably switchable between a data and a fax connection. As noted above, in other embodiments, telephone interface 42
30 may conform to the ISDN standards.

Processor 33 is preferably an economical 8-bit microprocessor or microcontroller, such as an Intel 80186 or NEC V-25. Nevertheless, any processor or combination of processors or equivalent programmable control logic capable of being programmed to perform the method of the present
35 invention, as described below, is suitable.

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As illustrated in Fig. 3, the device of the present invention may alternatively be embodied in an integrated fax machine, such as fax machine devices 14 and 28 shown in Fig. 1. Fax machine devices 14 and 28 each comprise a processor 46, a memory 48, a data/fax modem 50, a telephone interface 52, a scanner 54, a printer 56, a keypad 58 and a display 60. Scanner 54 may be of any type commonly used in fax machines for optically scanning documents. Similarly, printer 56 may be of any type commonly used in fax machines for printing received faxes. Keypad 58 and display 60 may be identical to keypad 41 and display 43, described above with respect to Fig. 2. Processor 46 and memory 48 may be identical to processor 33 and memory 34 described above with respect to Fig. 2. Also, telephone interface 52 may be identical to telephone interface 45, described above with respect to Fig. 2, with the exception that it has only a single data-side connection rather than two selectably switchable connections. Data/fax modem 50 is a well-known type of modem that, as the term "data/fax" implies, can selectably operate in accordance with either ITU data transmission standards or ITU fax transmission standards. Although any suitable data/fax modem 50 may be used, it preferably has an operating speed of 9.6 kbps or greater and preferably supports ITU V.32, V.34, V.32bis data communication standards and ITU V.21, V.29, V.27 and V.33 fax communication standards. Data/fax modem 50 may be, for example, a Rockwell V.FC 28.8 with fax firmware option. To facilitate voice mail communication, discussed below with respect to Figs. 9 and 10, data/fax modem 40 also preferably includes the manufacturer's voice firmware option.

Figure 5 illustrates the method of sending a fax via a computer network in accordance with the present invention. Although the method is described below with respect to the operation of the fax interface device shown in Fig. 2, the method may alternatively be performed using the integrated fax machine device shown in Fig. 3. Referring briefly to Fig. 1, a user may send a fax, for example, from fax machine 12 to fax machine 24. The sender (user) operates fax machine 12, and the recipient (another user) operates fax machine 24 in the same manner as they would any conventional fax machines. Returning to Figs. 5 and 2, at step 62 the sender inserts the document sheet(s) to be transmitted. In response, fax machine 12 enters an off-hook state at step 64. At step 66 fax interface

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Processor 33 receives the dialed telephone number and reads the directory to determine whether the dialed telephone number is present. At step 71 processor 33 determines whether the dialed number and its corresponding email address are present in the directory. If the dialed telephone number is present, at step 76 processor 33 reads the corresponding email address. This directory may be pre-stored by entering the information manually via keypad 41, via a storage device such as a floppy disk, or via an on-line connection to a service provider or similar entity. If the sender enters an e-mail address using keypad 41 instead of dialing a telephone number using fax machine 12, step 76 is not performed.

When processor 33 is to transmit an email message, it selectably connects data/fax modem 40 to telephone interface circuitry 42. At step 78 processor 33 causes data/fax modem 40 to dial the pre-stored telephone number of service provider 18. (As used herein, the term "service provider" refers to the computer system and related telecommunications equipment at that site rather than any individual or company operating the computer system.) Processor 33 may obtain this telephone number and any setup information needed to configure data/fax modem 40 from a non-volatile portion of memory 34. This telephone number and setup information may be pre-stored in memory 34 by entering the information manually via keypad 41 in response to prompts provided on display 43. Service provider 18 answers the call and thus establishes telephone connection 16.

Processor 33 then logs in to service provider 18 by transmitting a username, password and any other information requested by service provider 18. Persons of skill in the art will readily be capable of writing suitable software for logging on to a remote service provider. Figure 6 conceptually illustrates, among other software modules stored in non-volatile portions of memory 34, an on-line service interface 79 and a login agent 79. Such software is well-known to persons of skill in the art familiar with on-line communications programming, and are therefore not described in detail herein. On-line service interface 79 includes software to establish a connection with the on-line service and send and receive files and email, and to check on the status of email, as described in further detail below. If service provider 18 provides a connection environment utilizing the Serial Line Internet Protocol SLIP or Point-to-Point Protocol (PPP), on-line service interface 79 should include a SLIP/PPP software module 83.

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At step 96 processor 33 sends an email message with attached fax image to service provider 18. As shown conceptually in Fig. 6, an email agent 97 controls email communication with the email server of service provider 18. Email agent 97 may include any suitable email protocols, such as Multipurpose Internet Mail Extensions (MIME), Simple Mail Transfer Protocol (SMTP), uuencode and uudecode for encoding and decoding email attached messages and the Post Office Protocol (POP). Email agent 97 may also support telescript protocols developed by General Magic Corp. of Sunnyvale, California.

At step 98 service provider 18 receives the email message via telephone connection 16 and retransmits it via network 20. The email message received from interface device 10 has the same format as all email messages service provider 18 receives from its subscribers for retransmission via network 20. Therefore, service provider 18 processes the email message in the conventional manner. If the email message is not yet formatted in accordance with the required Internet protocols, service provider 18 completes the formatting.

The device of the present invention also can send faxes via the PSTN. As described above, at step 71 (Fig. 5), processor 33 determines whether the directory includes an email address corresponding to the dialed telephone number. If not, at step 100 processor 33 selectably connects the telephone line side 101 of fax interface circuitry 36 to telephone interface circuitry 42, thereby bypassing data/fax modem 40. Alternatively, fax modem 38 may receive the fax data via fax interface 36 and store it in memory 34. Data/fax modem 40 then retrieves the data and transmits it using fax communication standards via telephone interface circuitry 42. The sender need not be concerned whether the recipient possesses a device of the present invention or even whether the recipient possesses a system for reading email, because the present invention automatically transmits the data using fax communication standards if email is not possible. At step 102, processor 33 dials the recipient's telephone number that the sender entered or selected at step 68. Fax modem 38 then transmits the standard 1100 Hz fax calling tone and, at step 104, waits for the 2100 Hz fax answer tone that indicates the recipient's fax machine has answered the call. As described below in further detail, at step 106 process 32 determines whether an interface device of the present invention rather than

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provides the detection results to processor 33. Alternatively, telephone line interface circuitry 42 includes circuitry (not shown) for generating and detecting a modified answer tone signal comprising a 2100 Hz signal and an additional tone signal, such as a 1650 Hz signal having an active duration of 500 ms that follows the 2100 Hz signal.

As noted above with respect to step 98 in Fig. 5, after service provider 18 receives the email message it received via PSTN connection 16, service provider 18 forwards the email message via network 20. This gateway process is not described herein because service provider 18 forwards the email message in the conventional manner it uses to forward all email messages regardless of their source. Service provider 18 packetizes the email message if the format in which the email is received from interface device 10 is not already a packetized format. In Internet terminology, packets are known as datagrams. Each packet or datagram includes a source address and a destination address. In the example herein, the destination address represents the address of service provider 32. Routers (not shown) on network 20 route the email message packets or datagrams to service provider 32. The term "packet-switching" refers to the routers' use of the destination address to route the packets.

The service provider provides the email messages it receives to the subscribers to whom the email messages are addressed. In the above example, the recipient's interface device 26 will receive the email message from service provider 32. Service provider 32 may temporarily store the email messages it receives for later retrieval initiated by the subscribers to whom the email messages are addressed. Either service provider 32 or interface device 26 may initiate transfer of the email messages. If service provider 32 initiates the transfer, it may do so periodically or, preferably, immediately upon receiving an email message. If interface device 26 initiates the transfer, it periodically polls service provider 32 to determine if any messages have been stored. Conventionally, a subscriber can dial a service provider and download stored messages into the subscriber's computer using suitable software, which is typically provided by the service provider. In the present invention, the recipient's interface device performs a similar retrieval or polling function.

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corresponding to the fax image attachment of the undelivered email message using fax modem 38.

At step 124 processor 33 of interface device 26 separates the fax image attachment from the email header of the selected message. At step
5 126 fax interface circuitry 36 of interface device 26 generates a ring signal emulating that which the telephone company would normally provide. Fax interface circuitry 36 waits for fax machine 24 to answer by entering the off-hook state. At step 128 fax interface circuitry generates a calling tone emulating that which a calling fax machine would normally generate. In
10 response to the answer tone, fax modem 38 transmits the fax image data to fax machine 24 at step 130. At step 132 fax machine 24 prints the received fax and then terminates the call in the conventional manner.

Alternatively to the above-described method by which fax interface 26 polls service provider 32 to determine whether email messages have
15 been received, service provider 32 may automatically and immediately send any email message it receives. Service provider 32 may forward the email message immediately upon receiving it, periodically, or at a predetermined time. Figure 8 illustrates a method that interface device 26, under the control of processor 33, performs for receiving conventional faxes and email
20 messages, the latter either from service provider 32 or from another device of the present invention. At step 134 interface device 26 detects a ring signal via telephone line interface circuitry 42 and answers the call by entering the off-hook state. At step 136 telephone line interface circuitry 42 waits for the calling tone and generates the answer tone. If, at step
25 138, the standard 1100 Hz Group III fax calling tone is detected, processor 33 preferably proceeds to step 140 and selectably connects data/fax modem 40 to telephone interface circuitry 42. At step 142, data/fax modem 40, using fax communication standards, can then receive fax data, which processor 33 stores in memory 34. When the fax data transfer is
30 complete, service provider 32 and interface device 26 terminate the call. At step 143 processor 33 may decompress and/or decrypt the received data. Alternatively, processor 33 selectably connects the telephone line side 101 of fax interface circuitry 36 to telephone interface circuitry 42 before step 142. If at the time the call is received, however, fax modem 38 is busy
35 receiving fax data via fax interface 36, the fax may alternatively be received via data/fax modem 40.

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transfers the data to fax machine 24, and fax machine 24 prints the received fax in the manner described above with respect to these steps.

After interface device 26 receives an email message having an attached fax image, either in the manner described above with respect to Fig. 7 or the manner described above with respect to Fig. 8, interface device 26 may send a return email message to interface device 10, acknowledging receipt.

The present invention can also transmit voice messages as email attachments in a manner similar to which it transmits fax images as email attachments. In that respect, Fig. 9, which illustrates the method of sending a voice message via a computer network, is similar to Fig. 5. Although the method is described below with respect to the operation of the fax interface device shown in Fig. 2, the method may alternatively be performed using the integrated fax machine device shown in Fig. 3. Referring briefly to Fig. 1, a user may send a voice message, for example, from fax machine 12 to fax machine 24. Returning to Figs. 9 and 2, at step 164 the sender lifts the handset (not shown) of fax machine 12. In response, fax machine 12 enters an off-hook state at step 166. At step 168 fax interface 10 detects the off-hook condition and, in response, provides a dial tone to fax machine 12 that emulates the dial tone that the telephone company would normally provide on a customer's telephone line in response to an off-hook condition.

At step 170 the sender dials the recipient's telephone number using the keypad on the handset of fax machine 12. Alternatively, the sender may enter the recipient's email address using keypad 41. As a still further alternative, the sender may select a telephone number from a directory stored in memory 34 that includes recipients' names and corresponding telephone numbers. The sender may use keypad 41 to scroll through names and telephone numbers that are displayed in display 43 and then select one. At step 172 fax machine 12 generates the DTMF or pulse signals that indicate the dialed telephone number, and fax interface 10 receives and decodes the DTMF or pulse dialing signal.

After dialing is complete, at step 174 the user presses a button labeled "RECORD" (not shown) on keypad 41 of fax interface 10. While holding down the "RECORD" button, the user speaks into the handset microphone and dictates a voice message. At step 176 data/fax modem 40

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The present invention receives voice messages as email attachments in a manner similar to which it receives fax images as email attachments. In that respect, Fig. 10, which illustrates the method of receiving voice messages via a computer network, is similar to Fig. 7. At step 190 processor 33 of interface device 26 dials the telephone number of service provider 32. When service provider 32 answers the telephone call, processor 33 of interface device 26 logs in to service provider 32 in the manner described above with respect to step 112 of Fig. 7. At step 192 processor 33 determines whether service provider 32 has stored any email messages addressed to it. If no email messages have been stored, it terminates, i.e., hangs-up, the call by placing data/fax modem 40 on-hook at step 194. If email messages have been stored, however, processor 33 downloads the messages and stores them in memory 34 at step 196. At step 198 processor 33 selects a message to print in the same manner as described above with respect to step 122 of Fig. 7.

At step 200 processor 33 of interface device 26 separates the voice data attachment from the email header of the selected message. At step 202 fax interface circuitry 36 of interface device 26 generates a ring signal emulating that which the telephone company would normally provide. Fax interface circuitry 36 waits for fax machine 24 to answer by entering the off-hook state. At step 204 processor 33 sets data/fax modem 40 to voice mode and provides the voice data to the computer side of data/fax modem 40. Data/fax modem 40 converts this digital data to an analog audio signal and provides the audio signal on audio line 177. At step 206 fax machine 24 receives the audio signal and reproduces the voice message, to which the user listens through the handset speaker. When the message has been played, the user may hang up the handset.

Alternatively to the above-described method by which fax interface 26 polls service provider 32 to determine whether email messages have been received, service provider 32 may automatically and immediately send email messages it receives that include voice attachments. In a manner similar to that described above, fax interface 26 would receive the message from service provider 32, store it, and provide a ring signal to fax machine 24. When the user lifts the handset of fax machine 24, interface device 26 transmits the audio signal, and fax machine 24 reproduces the voice message, to which the user listens through the handset speaker.

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modifications when viewed in conjunction with the above specification and accompanying drawings.

WHAT IS CLAIMED IS:

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wherein said processor receives a telephone number produced by said facsimile machine and converts said telephone number to a destination address in response to said predetermined correspondence stored in said directory memory.

5

6. The interface apparatus claimed in claim 1, wherein said facsimile interface provides a ring voltage, dial tone signal, and a loop current to said facsimile machine.

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7. The interface apparatus claimed in claim 1, wherein said facsimile interface includes a circuit for detecting whether said facsimile machine is in an on-hook or off-hook state.

15

8. An interface apparatus for interfacing a facsimile machine to a computer network via a public switched telephone network, comprising:

facsimile interface means for providing signals emulating public switched telephone network signals to said facsimile machine;

modem means for communicating via said telephone network and said facsimile interface;

20

attachment memory means for storing said attachment data; and
processor means for controlling communication of attachment data between said modem and said attachment memory and between said attachment memory and said telephone network.

25

9. A facsimile machine for communicating with a computer network via a public switched telephone network, comprising:

an optical scanner for generating image data;

an input device for receiving a telephone number input by a user;

30 modem means connected to said telephone network for transmitting and receiving data in accordance with fax modem and data modem standards; and

35

a processor for receiving a telephone number from said input device, for converting said telephone number to a destination address representing a destination computer on said computer network, for associating said image data with said destination address, for controlling transmission of said image data and associated destination address to said modem means.

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15. An apparatus for transmitting facsimile machine information to a computer network via a public switched telephone network, comprising the steps of:

- 5 means for providing signals emulating public switched telephone network signals to a facsimile machine;
- means for receiving attachment data from said facsimile machine;
- means for generating a destination address corresponding to a destination computer on said computer network;
- 10 means for associating said attachment data with said destination address;
- means for establishing a first remote connection on said public switched telephone network;
- means for transmitting said attachment data and associated destination address via said first remote connection

15

16. An apparatus for receiving facsimile machine information from a computer network via a public switched telephone network, comprising the steps of:

- 20 means for providing signals emulating public switched telephone network signals to a facsimile machine;
- means for establishing a remote connection on said public switched telephone network;
- means for receiving attachment data via said remote connection; and
- 25 means for transmitting received attachment data to said facsimile machine.

17. The apparatus for receiving facsimile machine information from a computer network via a public switched telephone network claimed in claim 16, further comprising:

- 30 means for receiving text data associated with said attachment data via said remote connection; and
- means for separating said attachment data from said text data.

18. A method for transmitting facsimile machine information to a computer network via a public switched telephone network, comprising the steps of:

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22. The method for transmitting facsimile machine information to a computer network via a public switched telephone network claimed in claim 21, wherein said attachment data is image data.

5 23. The method for transmitting facsimile machine information to a computer network via a public switched telephone network claimed in claim 21, wherein said attachment data is voice data.

10 24. The method for transmitting facsimile machine information to a computer network claimed in claim 21, wherein said signals emulating public switched telephone signals include a ring voltage, dial tone signal and a loop current.

15 25. The method for transmitting facsimile machine information to a computer network claimed in claim 21, wherein said step of generating a destination address comprises the steps of:

 receiving a telephone number from said facsimile machine; and
 converting said telephone number to said destination address in
 response to a predetermined correspondence between a plurality of
20 telephone numbers and a plurality of destination addresses.

26. The method for transmitting facsimile machine information to a computer network claimed in claim 21, further comprising the steps of:

 receiving said attachment data and associated destination address at
25 a first remote location;

 distributing said attachment data into a plurality of packets, each
 including a portion of said attachment data and said associated destination
 address;

 transmitting said packets via a packet-switched computer network;
30 receiving said packets at another remote location;
 assembling said packets to reconstruct said attachment data;
 storing said attachment data;

 establishing a second remote connection on said public switched
 telephone network; and

35 transmitting stored attachment data via said second remote
 connection.

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establishing a connection on said public switched telephone network with said remote computer;

receiving attachment data and an associated destination address from said remote computer via said connection;

5 separating said attachment data from said associated destination address; and

transmitting said attachment data to said facsimile machine.

32. The method for receiving facsimile machine information from
10 a remote computer on a computer network via a public switched telephone network claimed in claim 31, wherein said attachment data is image data.

33. The method for receiving facsimile machine information from
15 a remote computer on a computer network via a public switched telephone network claimed in claim 31, wherein said attachment data is voice data.

34. The method for receiving facsimile machine information from
a remote computer on a computer network via a public switched telephone network claimed in claim 31, further comprising the steps of:

20 receiving text data associated with said attachment data from said remote computer via said connection; and

separating said attachment data from said text data.

35. The method for receiving facsimile machine information from
25 a remote computer on a computer network via a public switched telephone network claimed in claim 34, further comprising the step of displaying text representing said text data on a display.

36. The method for receiving facsimile machine information from
30 a remote computer on a computer network claimed in claim 31, wherein said step of establishing a remote connection on said public switched telephone network comprises the steps of:

dialing a telephone number associated with said remote computer;

transmitting a password to said remote computer; and

35 determining whether stored attachment data exists in said remote computer.

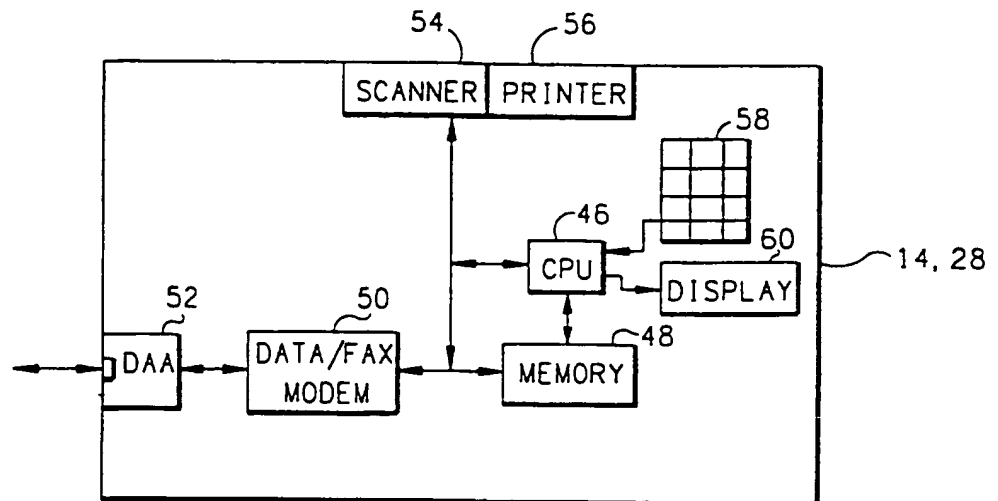


FIG. 3

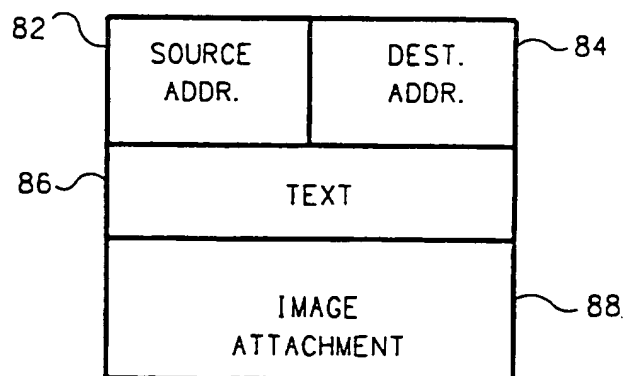
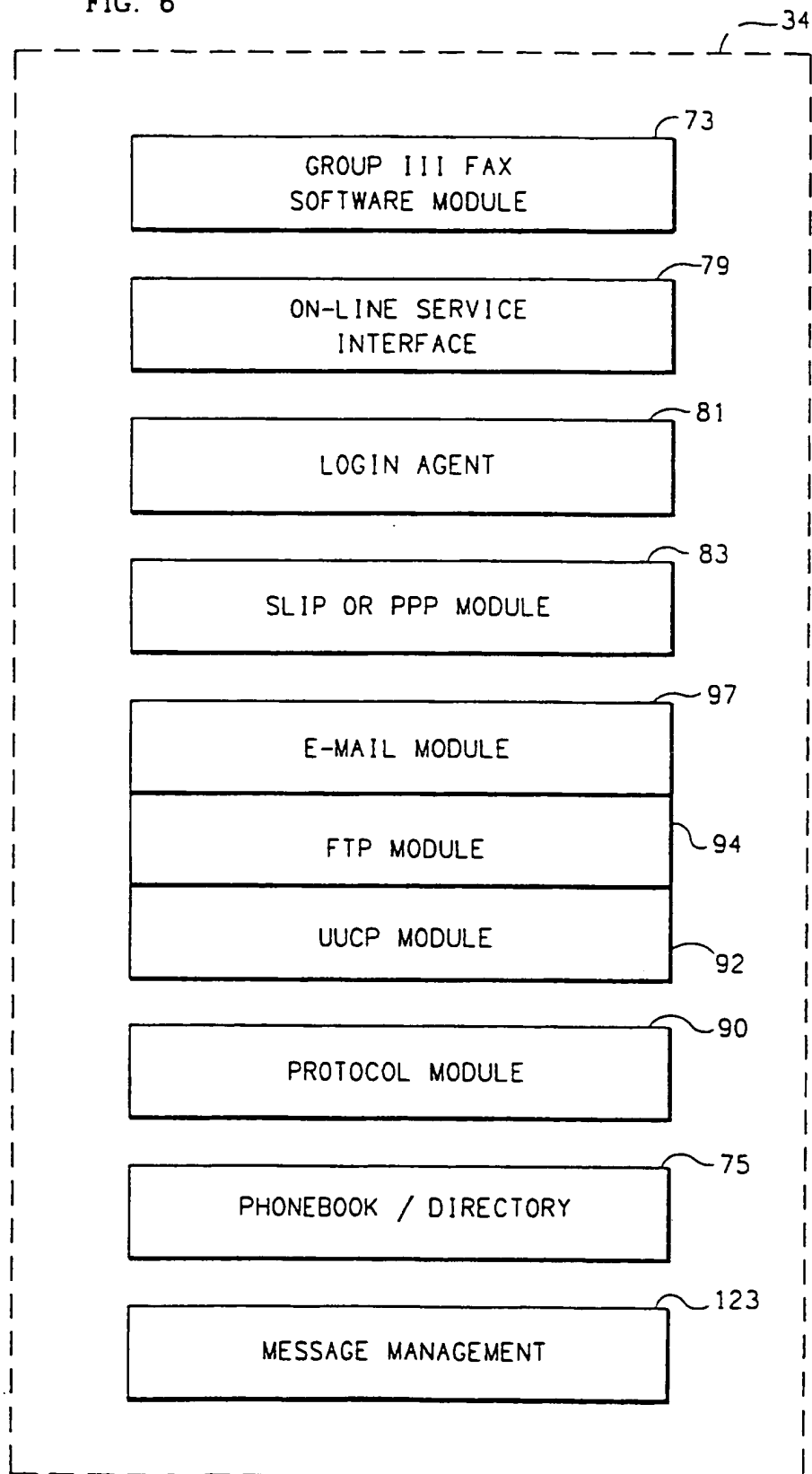


FIG. 4

FIG. 6



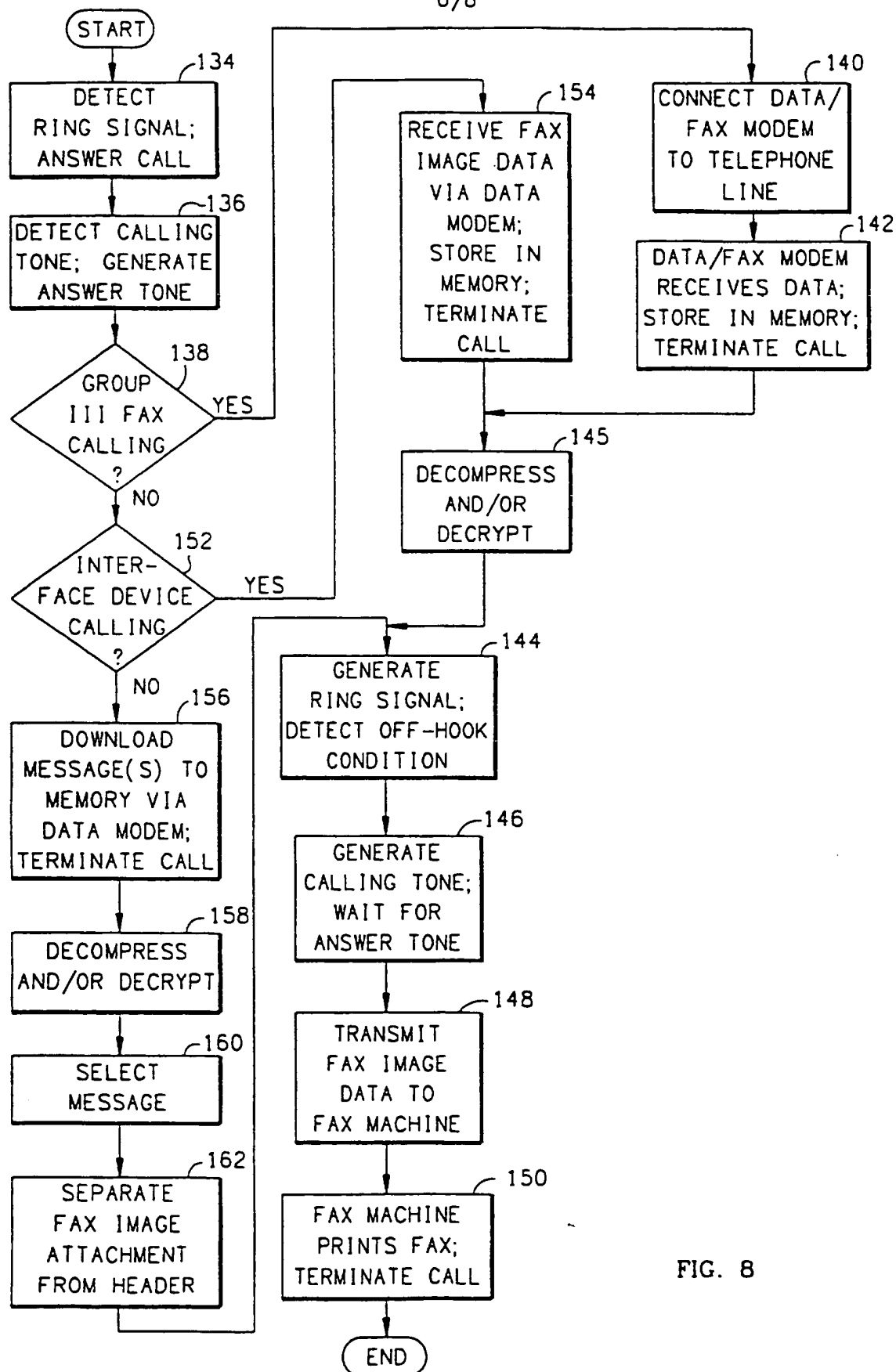


FIG. 8

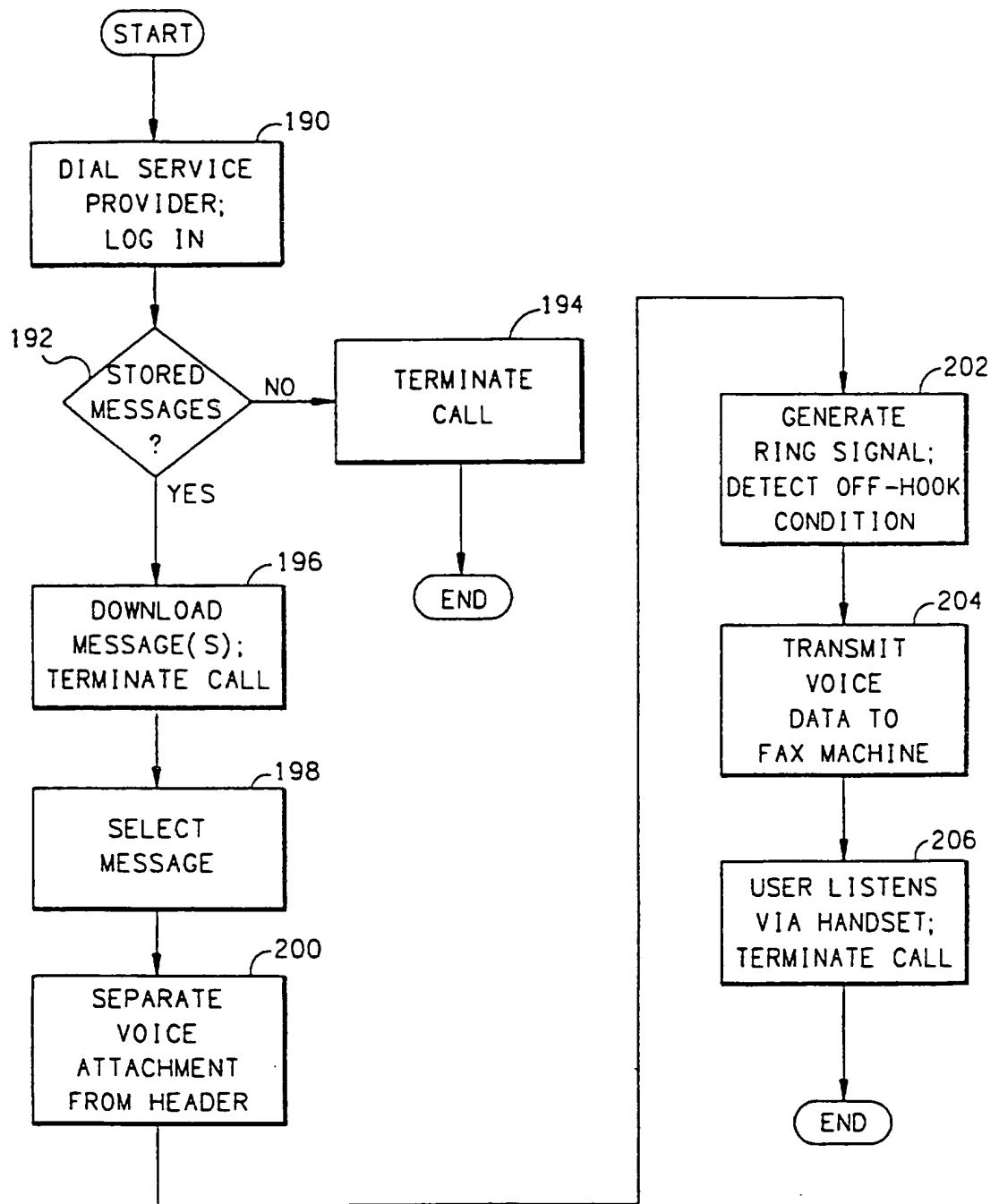


FIG. 10

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 96/13790

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